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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 289,

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IMPORTANT TELEPHONE DECISION.

Judge Lowell, of the United States Circuit Court, Boston, Mass., rendered an important decision on the 27th ult., in which he virtually confirms to the American Bell Telephone Company, *the exclusive right of talking over a wire by electricity*. If this decision is correct, then the Telephone Company is in possession of one of the most gigantic and extraordinary monopolies ever obtained by an individual or acquired by a private corporation. It will almost bear comparison with the patent issued by the Spanish sovereigns to Christopher Columbus for his discovery of the New World, by which the continent, its peoples, and their possessions, were placed under his thumb and that of his heirs forever. But the magnitude of that grant caused its ultimate downfall; and possibly the Bellonian patent may, with more justice, meet a similar fate when it reaches the Supreme Court of the United States.

If it does not, if this decision stands, what a marvelous honor belongs to Alexander Graham Bell! What an astonishing benefit he has conferred upon his fellow men! He is declared to be the original and first discoverer of the far-reaching art of speech transmission by electricity.

The suit in question was brought by the American Bell Telephone Company against Albert Spencer and others, and the decision, as we understand, is based on the fifth clause of Bell's claim, patent of February 14, 1876, as follows:

"5. The method of, and apparatus for, transmitting vocal and other sounds telegraphically, as herein described, by causing electrical undulations, similar in form to the vibrations of the air, accompanying the said vocal or other sounds, substantially as set forth."

The court decides that the specific method of producing the electrical undulations employed by the defendants is different from the Bell plan. The defendant's device is made on the principle of the microphone, which has been very much improved since the date of the first Bell patent. The judge says: "If the Bell patents were for a mere arrangement or combination of old devices to produce a somewhat better result in a known art, then, no doubt, a person who substituted a new element not known at the date of the patent might escape the charge of infringement. But Bell discovered a new art—that of transmitting speech by electricity, and has a right to hold the broadest claim for it which can be permitted in any case—not to abstract right of sending sounds by telegraph without any regard to means, but to all means and processes which he has both invented and claimed."

It has been heretofore supposed by electrical laymen that Bell's devices are simply improvements upon something previously done in the same line by others, such as Œrsted, Reiss, Gray; and that consequently Bell's broad claim to the art of transmitting speech by electricity was an absurdity, and would be so declared whenever it was submitted to a proper judicial examination. But a trial has been had, the laymen are defeated, and the hopes of hundreds of telephonic inventors laid low in the dust. It may be, however, that the near future has relief for them in store.

Judge Lowell pays a just tribute to the learning and ingenuity of Professor Reiss, but holds that his telephone of 1860 was an imperfect instrument, which, although some sounds of the voice could be sent, was still incapable of completely transmitting articulate speech. This differs from accounts we have had of the Reiss telephone, and perhaps the entire evidence in respect thereto was not brought out before the court.

It may equally be said of Bell's telephone, that while it is a good receiver it is a poor transmitter—so poor that its use has been almost abandoned in favor of superior instruments such as the Blake or the Edison. If we had to rely only on the Bell instruments the telephone would be a nuisance, and the wide-spread use of speaking telegraphy now enjoyed could never have been realized.

THE GREAT COMET OF 1881.

The comet whose appearance was announced last week continues to be the subject of much wonder, speculation, and scientific study. Though less striking in appearance than Donati's comet of 1858, it is one of the most brilliant and interesting of these erratic visitors to our skies that scientists have been permitted to study.

So far as heard from the comet was first observed in the northern hemisphere about four o'clock of the morning of June 20, by G. W. Simmons, Jr., of Boston, while camped at Moreles, Mexico, 30 miles west of Eagle Pass, west of the Rio Grande, about latitude 29.

It appeared in constellation Auriga, about 8 degrees from the star Capella, and from its proximity to the sun was at first visible each clear day only for a short time just before sunrise and again for a little while in the evening. Its northward motion, however, soon carried it to a position permanently above the horizon. At first the head of the comet shone like a star of the first magnitude, while the tail glowed like a streamer of the northern lights.

In the absence of a sufficient number of observations for the exact calculation of the elements of the comet's orbit the estimates of the dimensions of the head and tail and their distance from the earth are little better than guesses. At Harvard University, on the 24th, the comet was thought to be about 69,000,000 miles from the sun and 29,000,000 miles from the earth. The nucleus was estimated to be 1,000 miles in diameter, the coma or nebulous head 12,000 miles in diameter, and the tail 40,000,000 miles long.

On the 27th Prof. Lewis Boss, of Dudley Observatory, Albany, N. Y., calculated the comet to be about 34,000,000 miles from the earth, and receding at a rate of nearly 1,000,000 a day. At that date the nucleus was estimated by him to be 1,200 miles in diameter, and the first and brightest semicircular envelope of the head appeared about 14,000 miles broad. The largest branch of the tail measured, he thought, at least 35,000,000 of miles.

On the night of the 26th, as seen from the same observatory, the tail was traced for forty degrees. One branch of the tail passed in a perfectly straight line about two degrees to the East of the Pole Star. The other branch was shorter and fainter, and curved to the westward (eastward, astronomically), terminating at a point about five or six degrees southwest of Polaris. The air was wonderfully transparent, and the fine gauze-like tail became an object of delicate and fascinating beauty.

Thus far no agreement has been arrived at among astronomers touching the comet's identity and orbit. By some its (approximate) elements are thought to resemble most those of the comet of 1807; others find greater resemblance to the elements of the comet of 1684. The majority of observers hold that the comet is receding, having made its peribelion passage some time in June, various dates being given. Most probably the comet is the one observed by Dr. Gould in South America on the first of June.

The comet was photographed for the first time June 26, by Dr. Henry Draper, of this city, and on several succeeding nights its photograph was secured here, and also, it is reported, in Europe. Dr. Draper has likewise made careful studies of the composition of the several parts of the comet by means of spectrum analysis. The nucleus gives a continuous spectrum, indicating a solid or liquid body heated to incandescence. The coma, or cloud about the head of the comet, gives a banded spectrum indicating the presence of some compound of carbon in the gaseous envelope. The tail gives a continuous spectrum which is not crossed by the characteristic lines of solar light, from which it is inferred that the tail shines by its own light, not by reflected sunlight, and that the incandescent particles which compose the tail are solid. On the strength of these discoveries Dr. Draper expresses the belief that the nucleus is composed of mineral substances, partly, perhaps, of olivine, which is an ingredient of meteorites, and of some volatile element which yields to the influence of heat. As the comet approaches the sun, the volatile part is turned into gas by the heat, and flames out to form the coma. The fact that the coma is always on the sunward side of the nucleus strengthens this supposition. But after bursting forth on the side toward the sun, the vapor seems to be repelled and to stream away from the sun, thus forming the tail. The cause of this repulsion cannot be absolutely asserted; but in all probability electricity has something to do with it.

CHEMICAL ACTION IN A MAGNETIC FIELD.

Every student is familiar with the experiment in which fine iron filings are dusted over a plate and subjected to the influence of the poles of a magnet. The iron does not remain uniformly distributed, but falls into systems of lines which mark what are called the lines of magnetic force. Excellent illustrations of these curves will be found in connection with Professor Mayer's articles on magnetism (SCIENTIFIC AMERICAN, vol. xli., pages 211, 212, etc.). These lines of magnetic force occupy what Faraday named the magnetic field which surrounds the poles of every magnet to a distance greater or less according to the strength of the magnet. Recently Professor Ira Remsen, of Johns Hopkins University, has undertaken some novel experiments to ascertain whether the chemical behavior of a metal is in any way influenced by magnetic action, and has arrived at results which are of considerable interest.

His best effects were obtained by placing a shallow vessel of thin iron, containing a solution of copper sulphate, over the poles of a magnet. Out of the magnetic field the solution would deposit upon the iron vessel a uniform coating of copper. When brought within the field of a permanent magnet capable of supporting twenty-five kilogrammes (55 pounds) the copper was deposited in a fairly uniform way on the entire plate except at the lines marking the outlines of the poles. These lines were sharply marked as depressions in the deposit. When, instead of a permanent magnet, an electro-magnet was employed, the iron vessel and copper solution being the same as before, a more striking action was observed. There was no deposit of copper for a narrow space marking the outline of the poles. Within the outline (over the poles) the deposit was fairly uniform. Outside the blank outline marking the pole the copper was deposited in irregular ridges running at right angles to the lines of force and apparently coincident with the lines marking the equipotential surfaces. By increasing the power of the electro-magnet the action is intensified and the area affected is broadened, the largest circles obtained in Prof. Remsen's experiment being nearly four inches in diameter. The cause of the phenomenon has not yet been determined, though the effects are obviously to be ascribed to the influence of the magnetism on the iron plate, or on the liquid, or on both together. Further experiments will decide between these possibilities. A full report of the work thus far done will be found in the current issue of the SCIENTIFIC AMERICAN SUPPLEMENT. The experiments are easily repeated, and open up a novel and interesting field of inquiry.